DIRECT TESTIMONY OF
GREGORY M. LANDER
ON BEHALF OF
SOUTH CAROLINA COASTAL CONSERVATION LEAGUE AND
SOUTHERN ALLIANCE FOR CLEAN ENERGY
DOCKET NO. 2019-2-E

INTRODUCTION

Q. Can you please state your name and employment?

A. My name is Gregory M. Lander. My business address is 83 Pine Street, Suite 101, West 3 Peabody, MA 01960, and my email address is glander@skippingstone.com.

Q. On whose behalf are you testifying?

A. The South Carolina Coastal Conservation League and the Southern Alliance for Clean Energy.

Q. What are your qualifications?

A. I am President of Skipping Stone, LLC ("Skipping Stone").

Q. What is your educational and professional background?

A. I graduated from Hampshire College in Amherst, Massachusetts, in 1977, with a Bachelor of Arts degree. In 1981, I began my career in the energy business at Citizens Energy Corporation in Boston, Massachusetts ("Citizens Energy"). I became involved in the natural gas business of Citizens Energy in 1983. Between 1983 and 1989, I served as Manager, Vice President, President and Chairman of Citizens Gas Supply Corporation (a subsidiary of Citizens Energy). I started and ran an energy consulting firm, Landmark Associates, from 1989 to 1993, during which time I consulted on numerous pipeline open access matters, a number of Federal Energy Regulatory Commission ("FERC") Order No. 636 rate cases, pipeline certificate cases, fuel supply and gas transportation issues for independent power generation projects, international arbitration cases involving

renegotiation of pipeline gas supply contracts, and natural gas market information requirements cases (FERC Order Nos. 587 et seq.). In 1993, I founded TransCapacity LP, a software and natural gas information services company. Since 1994, I have also been a Services Segment board member of the Gas Industry Standards Board ("GISB") and its successor organization, the North American Energy Standards Board ("NAESB"). During the period 1994 to 2002, I served as a Chairman of the Business Practices Subcommittee, the Interpretations Committee, the Triage Committee, and several GISB/NAESB Task Forces. I am currently a Board Member of NAESB and have served continuously in that capacity since 1997. Skipping Stone, Inc. acquired TransCapacity in 1999, and since that time I have headed up Skipping Stone's Energy Logistics practice, where my specialization has been interstate pipeline capacity issues, information, research, pricing, acquisition due diligence and planning. In 2001, Skipping Stone launched CapacityCenter.com, a pipeline capacity information service. In 2004, Skipping Stone was acquired by Commerce Energy Group, a national retail energy services provider. In 2005, I was appointed President of Skipping Stone, which operated as a wholly owned subsidiary of Commerce Energy Group. In 2008, I purchased substantially all of the assets of Skipping Stone and now operate essentially the same business as before the Commerce Energy transaction as Skipping Stone, LLC.

From 1984 to present, I have maintained a deep familiarity with a wide range of pipeline transportation issues, beginning with access to pipeline capacity to make competitive sales, resolution of the pipeline take-or-pay contracting regime, pipeline affiliate marketer concerns, restructuring of the pipelines from merchants to transporters and thereafter, and definitions of what constituted a pipeline capacity "right" for the

purposes of formulating the then newly commenced capacity release and capacity rights trading business process. I continue to be involved in nearly all facets of the capacity information and trading business as part of my duties at Skipping Stone. In addition, I have been the lead principal on all 50+ pipeline and storage mergers and acquisitions transactions as well as all pipeline and storage facility expansion projects for which Skipping Stone has been retained by potential purchasers and project sponsors to provide economic due diligence consulting and market analysis.

Q. Have you filed testimony in regulatory proceedings previously?

A. I have filed testimony in several proceedings including FERC Docket No. RP04-251-000, which was an El Paso Natural Gas Company ("EPNG") proceeding regarding pathing and segmentation. In FERC Docket No. RP08-426-000, (also an EPNG proceeding), I sponsored answering and supplemental answering testimony. I also filed testimony in FERC Docket No. RP10-1398, the first fully litigated EPNG Rate case in more than three decades. In addition, I have filed testimony in Massachusetts Department of Public Utilities Case Nos. 13-157, 15-34, 15-48, 15-39; Maine Public Utilities Commission Case No. 2014-00071; Virginia Corporation Commission Case No. PUR-2017-00051; Missouri Public Service Case GR-2017-0215; GR-2017-0216; and California Public Utilities Commission Cases 17-10-007 and 17-10-008 (Consolidated) Applications of San Diego Gas & Electric (U902M) and Southern California Gas Company (U 338-E) for Authority, Among Other Things, to Update its Electric and Gas Revenue Requirement and Base Rates Effective on January 1, 2019; South Carolina Public Service Commission Docket Nos. 2017-370-E; 2017-305-E; and 2017-207-E; and,

Federal Energy Commission Docket No. ER18-1639. Please refer to Exhibit GML 1, which contains a full list of case names and docket numbers as well as my current CV.

SUMMARY

Q. Can you provide a summary of your testimony?

A. My testimony concerns how well the Company minimizes customer fuel costs while supplying reliable electricity to its retail customers. In short, there are two distinct areas where the Company has failed to reasonably minimize customer cost, and those failures should reduce the amount of cost the Company may pass on to its customers. First, SCE&G has signed two new pipeline contracts that concern me. While the costs of those contracts are not currently before this Commission, I highly doubt those contracts will provide ratepayers any financial benefit, and the Commission should consider action to protect ratepayers from expensive, needless contracts. Second, SCE&G has a contract currently included in this proceeding that seems highly suspect.

OVERVIEW

Q. Your testimony concerns natural gas fuel costs, correct?

A. Correct.

Q. Are there any high level concerns about natural gas markets that you want to start with?

A. Yes. I think it's important to begin by noting that the costs of delivering fuel to natural gas-fired power plants include two distinct costs: (1) the gas itself, which is the commodity price and (2) the transportation cost. When added together, these make up the "delivered" price of gas.

Q. What determines the commodity price?

A. A variety of factors, but the most important element to consider here is that natural gas comes from all over the country and is produced in different production areas. The cost of gas in one production area can, and often does, differ from the cost of gas in a different production area.

Q. What determines the transportation price?

A. Transportation is the cost of using a natural gas pipeline. Each pipeline is priced differently, depending on its size, location, sometimes distance of haul between receipt and delivery locations, and age.

Q. Where does SCE&G get its natural gas for power generation?

A. SCE&G gets gas from a variety of sources, according to data supplied by SCE&G in this case.

Q. Can you break down those sources for us?

A. As part of my analysis I grouped individual supply locations into their respective pricing points (*i.e.*, the points associated with published indices' locations) which would put the various supply locations into the same published index point.

Q. What is an index point?

A. An "index point" is a published price for a specific pooling location, or group of receipt and/or delivery locations.

Q. What is a pooling location?

A. A pooling location, in turn is a virtual location at which parties buying or selling gas on a particular pipeline engage in trades.

Q. You say it's "virtual." How does that work?

A. The way a pooling point works is that parties with supply in the areas specified by the pipeline tell the pipeline that they want to sell an amount of that supply to a buyer, and in turn, the buyer tells the pipeline that they wish to buy the same amount from the seller. The pipeline then transfers this amount from the selling party to the buying party. Once that happens, the buying party either sells the gas again to another party at the pool, or puts the gas onto a transportation contract in order to move the gas to another location on the pipeline.

Q. Ok. So what does Figure 1 show us?

A. Figure 1 shows all the distinct points at which SCE&G bought gas for electric generation during the full year period of January 1, 2018 through December 31, 2018.

Figure 1

Distinct Supply Points	Volume (Dth)	Pct of Supply	Index Point
604000			Unknown
AIKEN			Transco Zn 5 South
Cope			Transco Zn 5 South
DECGT			Transco Zn 5 South
ELBA			Transco Zn 5 South
ELBA-IT			Transco Zn 5 South
GROVER			Transco Zn 5 South
PETAL STORAGE			Transco Zone 4
PORT WENTWOR			Transco Zn 5 South
PORT WENTWOR-Jasper			Transco Zn 5 South
ROSEHILL			Unknown
SEMI SNG Z3			Southern Natural
SNG POOL			Southern Natural
SNG Z3 POOL			Southern Natural
STATION 85			Transco Zone 4
TRANSC LEIDY			Transco Leidy Line
Total Supply			

Source: SCE&G Response to CCL& SACE Attachment 1-24 b.; Analysis Skipping Stone.

Q. It looks like multiple supply points share an index point. Is that relevant?

A. Yes. In fact I calculated the total amount of supply the Company gets from each Index Point, as shown in Figure 2:

Figure 2

Index Points	Volume (Dth)	Pct of Supply
Southern Natural	[redacted]	
Transco Leidy Line		
Transco Zn 5 South		
Transco Zone 4		
Unknown		
Total Supply		

Source: SCE&G Response to CCL& SACE Attachment 1-24 b.; Analysis Skipping Stone.

As can be seen, SCE&G sources about [redacted] of its gas from locations whose pricing point is tied either to Transco Zone 5 South or Transco Zone 4. An additional [redacted] is purchased at locations tied to Transco Leidy Line, and [redacted] is purchased at locations tied to a Southern Natural pricing point.

Q. You mention Transco Zone 5 and Zone 4. What does that mean?

A. The Transco pipeline is the main artery of all natural gas on the East Coast. It runs from the Gulf of Mexico to New York. This map at Figure 3 shows the Transco pipeline and the relevant zones I'm discussing.

Figure 3

Source: http://www.1line.williams.com/Transco/files/presentations/2012ExecCustMeet.pdf (Zone labels and dividing lines added by Skipping Stone for clarity).

Q. Is it most advantageous for SCE&G customers to get [redacted] of the gas from locations tied to Transco Zone 5 South?

A. No. All of that supply could be displaced with other Transco supplies that might be more price advantageous. Here, a quick discussion of prices at the various pricing locations is in order.

Q. What does Figure 4 show?

A. Figure 4 shows the average seasonal prices at the pricing points (Index Points) where SCE&G purchases about [redacted] of its supply for electric generation (as well as two other Index Points for reference).

Figure 4

Seasonal Periods	Days in Period	Southern Natural Avg Price	Transco Zone 4 Avg Price	Transco Zone 5 Avg Price	Transco Zone 5 North Avg Price	Transco Zone 5 South Avg Price	Dominion South Avg Price	Transco -Leidy Line Avg Price
Shoulders 2017	122	$2.960	$2.960	$3.010	$2.960	$3.030	$1.740	$1.715
Shoulders 2018	122	$2.835	$2.855	$2.975	$2.955	$2.970	$2.350	$2.080
Winter 2017/2018	151	$2.760	$2.780	$3.090	$3.075	$3.095	$2.425	$2.375
Winter 2018/2019 thru 3/9	151	$3.143	$3.138	$3.660	$3.665	$3.653	$3.015	$3.100
Summer 2017	92	$2.870	$2.900	$2.950	$2.895	$2.980	$1.850	$1.810
Summer 2018	92	$2.870	$2.890	$2.980	$3.000	$2.990	$2.430	$2.350

Source: Natural Gas Intelligence; Analysis Skipping Stone.

Q. What do we learn from this table?

A. This table shows three important facts. First, the prices in Zone 5 North do not differ from the prices in Southern Zone 5 (Zone 5 South) very often (shown in the lightly shaded cells). Second, when they do differ, sometimes Transco Zone 5 North is lower priced than Transco Zone 5 South, and sometimes it's the reverse. That said, in recent years, Transco Zone 5 South tends to be higher priced than Transco Zone 5 North, but the average price in Transco Zone 5 South is now trending below that of Transco Zone 5 North. Third, between 2017 and 2018, the differences between Zone 5 South and Zone 5 North have shrunk.[1]

Q. This table shows three Transco Zone 5 pricing points: Transco Zone 5 South, Transco Zone 5 North, and Transco Zone 5 (*i.e.*, neither designated as North or South). Can you explain this and identify the areas of Transco that correspond to these different pricing locations?

A. Yes. Transco has one "pooling point" in each of its six tariff Zones where it permits pool to pool (*i.e.*, party to party) trades. In tariff Zone 5, that "pooling point" is

[1] For the Winter of 2018/2019, the data is only through March 9, 2019 owing to the date this testimony is due.

associated with Transco Station 165. Trades at this location set the published Transco Zone 5 pricing (or index) point.

Q. Ok. That's Transco Zone 5. What about Transco Zone 5 North?

A. Trades that are made on a delivered basis to locations on the Transco system ***north*** of that point (up to the northern end of Transco 5 – and approximate to Transco Station 185) are reported as Transco Zone 5 North sales.

Q. And Transco Zone 5 South?

A. Trades that are made on a delivered basis to locations on the Transco system ***south*** of that point (down to the southern end of Transco 5 – proximate to the GA/SC border, Elba Express and between Transco Station 130 and Transco Station 135) are registered/reported in the trade press as Transco Zone 5 South priced sales.[2] DECGT's interconnections with Transco are between Transco Stations 140 and 145. Since July of 2016 a large trade publication, Natural Gas Intelligence (NGI), has published prices for all three Zone 5 pricing points.[3]

Q. So, Transco Zone 5 is "pool to pool," while Transco Zone 5 North and Transco Zone 5 South are "delivered"?

A. Correct.

[2] The way gas trading on Transco works, gas can be traded at any location. When it is traded at a pool the transfer is party to party. When it is traded at another location the delivering party (seller) identifies themselves and the contract out of which the gas goes to the buyer (receiving party). Once received by the buyer, that party can put the gas onto a contract on Transco and take that gas to locations covered by their contract. The only real difference is that the parties respective contracts have to be identified to Transco for these "other location" trades, whereas at pools only the respective parties need to be identified to Transco; and the trading parties need not divulge to one another their contract information.

[3] The Platts publication, Gas Daily also reports prices for these three individual pricing points.

Q. Is there any significance to the fact that NGI has published these three pricing points since July of 2016 and yet there is only one Transco "Pooling point" in Zone 5?

A. Yes. It means that the three pricing locations are liquid,[4] in that there are numerous trades each day corresponding to each location that are reported to NGI.[5]

Q. Why do you note the price differences between Transco Zone 5 North and Transco Zone 5 South?

A. Because, as I will discuss below, SCE&G can only access Transco Zone 5 North supplies if it has capacity on pipelines to deliver gas from Transco Zone 5 North to SCE&G gas plants.

Q. How could SCE&G get gas from Transco Zone 5 North to its gas plants?

A. SCE&G largely depends upon the DECGT pipeline system to deliver gas to its gas fleet. To connect the DCEGT pipeline to gas supply areas, SCE&G uses (or gets gas from others using) the Transco mainline, which runs all the way from the Gulf of Mexico to Pennsylvania and New York/New Jersey. In addition, other pipelines all along the Transco route bring gas from various production areas to Transco.

Q. Ok. That's the main line, but Transco doesn't connect directly to the power plants does it?

A. No. Laterals off of Transco, and other pipelines connected to Transco, bring gas off of Transco for power plants and distribution companies to use. At present, SCE&G holds [redacted] Dth per day of firm capacity on Transco from supply areas to DECGT,

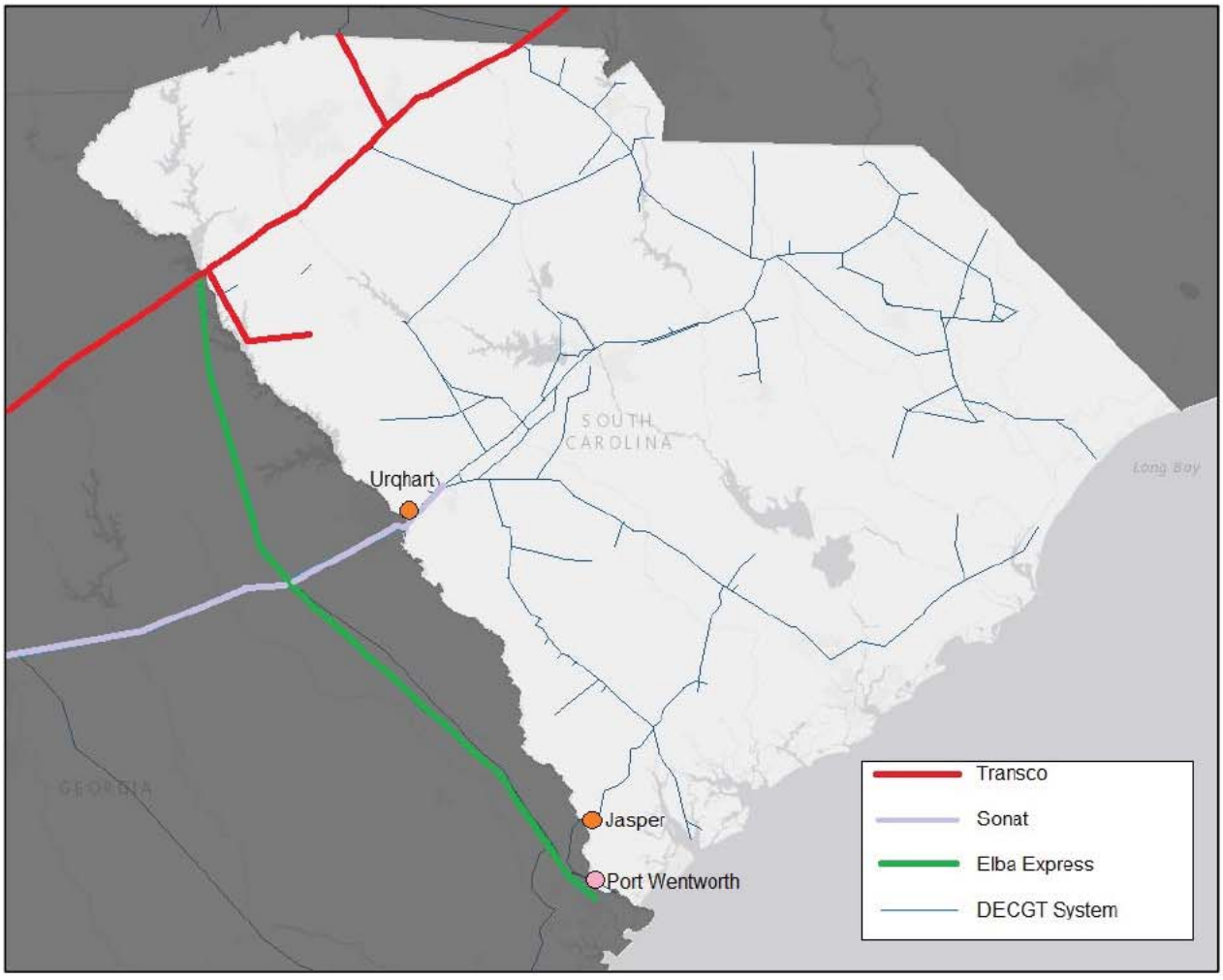
[4] The relevance of this "liquidity" aspect will become evident when I make recommendations below.
[5] Since July 1, 2016, there was one day that NGI published no price for Transco Zone 5 North. That was September 1, 2017. NGI published a price for each of Transco Zone 5 South and Transco Zone 5 on every price publishing day since NGI commenced reporting prices for Transco Zone 5 South trades.

which is the pipeline network within South Carolina that SCE&G uses to move gas to its specific power plants, as shown in Figure 5. SCE&G also holds firm capacity ([redacted] Dthd) on Sonat which is capable of delivering to both its Aiken, SC plant (Urquhart) as well as to DECGT.

Q. Are Transco and Sonat the only pipelines that can deliver gas to DECGT?

A. No. Figure 5 shows the South Carolina pipeline system, taken from EIA that I have modified to show the specific pipelines and a few other key locations.

Figure 5



Source EIA, modified by Skipping Stone.

Q. And what can we learn from Figure 5?

A. DECGT sources gas primarily from Transco and Sonat, but there is another pipeline capable of serving DECGT: Elba Express (Elba). Elba connects between the Southern LNG (SLNG) location and Transco.[6] Currently, SCE&G has no firm capacity on Elba. At present, Elba delivers gas that is priced (for the most part) in reference to the Transco Zone 5 South Index Point.

Q. How does Elba figure into the picture?

A. Although it was originally built to move about 1.9 Bcfd of gas from SLNG to Transco (*i.e* importing gas) it actually now serves primarily to move gas from Transco southward to (1) Cypress to serve the Florida markets of Sonat, (2) DECGT at Port Wentworth and beyond to (3) the SLNG facility where soon liquefaction will commence. Because the gas going into Elba comes from Transco, it is associated with the Transco Zone 5 South Pricing point.

Q. How does SCE&G's capacity on interstate pipelines compare with its capacity within the South Carolina distribution system?

A. To serve both its gas customers' loads and its other power plants, SCE&G holds [redacted] Dthd of firm capacity on DECGT itself.[7] The sum of SCE&G's Transco and Sonat capacity ([redacted] Dthd) is significantly less than the total of its DECGT capacity. In other words, SCE&G has more capacity ***on*** the DECGT system within South Carolina than it has capacity to deliver ***to*** the DECGT system.

[6] The Elba Express pipeline was originally built to move imported LNG delivered to and stored at Southern LNG to Transco. Seldom in recent years has gas flowed from the SLNG location into the market; for the most part, gas has moved from Transco onto and through Elba Express (Elba) to Sonat's Cypress line near Savannah and down into Atlantic coastal Florida and to DECGT at Port Wentworth. Soon, more gas will also flow down the Elba line to SLNG's LNG liquefaction facilities to produce LNG for export.

[7] This total of SCE&G capacity on DECGT is inclusive of the most recent capacity additions.

Q. Why is that?

A. SCE&G must obtain gas to serve its two demand types (*i.e.* gas and electric loads), and there are constraints on its ability to get sufficient gas into DECGT from Sonat. SCE&G has one delivery point out of Sonat (*i.e.*, Urquhart – which, as gas flows on Sonat, is located before where Sonat delivers to DECGT), but both these points are on the extreme end of the Sonat system, and there is no excess of firm capacity available on Sonat to either of those locations.

Q. But what about Transco?

A. With respect to Transco, there is abundant supply contracted to flow past the locations on Transco that deliver to DECGT and Elba. We know this because SCE&G purchases gas for electric generation at locations where Transco shippers deliver gas to DECGT and Elba. When this occurs (*i.e.*, roughly [redacted] of the time) SCE&G is purchasing gas on a "delivered basis."

Q. What does "delivered basis" mean?

A. "Delivered basis" is when the seller brings the gas to SCE&G either into DECGT or into/out of Elba[8] and the price is a delivered price (*i.e.*, can be priced, or, purchased) at or near the Transco Zone 5 South price. Delivered gas also means that SCE&G is buying gas at locations where it either burns the gas or at a location from which SCE&G has capacity to move the gas from the purchase point to the use point. Finally, "delivered

[8] From the data supplied by SCE&G as to its purchase locations, it references "ELBA" and it is not clear from the reference whether the referenced "ELBA" is into or out of ELBA. "Into ELBA" would be most likely from Transco (although Elba can also receive gas from Sonat and from SLNG). "Out of Elba" would be into DECGT at Port Wentworth. The reason I concluded that the SCE&G references to "ELBA" were "into Elba" was because the SCE&G responses also made reference, separately, to purchases at Port Wentworth (*i.e.*, an "out of Elba" location).

gas", from the perspective of the seller, means that they are selling the gas at a point that can act as a delivery point out of the pipeline they are transporting the gas on.

Notably, because SCE&G's Transco capacity, especially that from the Transco Leidy Line locations[9] to DECGT flows past the Zone 5 North location, SCE&G could buy at that location as well. However, it is more price-advantageous to buy gas at Transco Leidy Line locations, which it is clear that SCE&G does.

Q. Why do you discuss where SCE&G buys its gas for electric generation?

A. The reason this is important is because SCE&G has three precedent agreements that, among them, commit SCE&G (and potentially its ratepayers) to an additional [redacted] Dthd of firm capacity.

Q. You say "commit." Does that mean these contracts are not yet serving customers?

A. Correct.

Q. Then why bring it up now?

A. Because I believe these contracts will not provide value to the ratepayer, and I want the Commission to know why I think that.

Q. Before you get into the detail, please explain at a high level what you mean.

A. A utility's job is to provide reliable service at the lowest reasonable cost. In my mind, lowest reasonable cost is not identical to absolute lowest cost.

Q. Why not?

A. Well, for one thing, as we discussed earlier, gas prices vary at different supply sources. Not only do they vary among themselves, but they differ in time, meaning that

[9] Transco Leidy Line locations are associated with the portion of Transco that runs through Pennsylvania; and it is this area in which Marcellus shale gas is produced.

Location A may be lower cost than *Location B* today, but the inverse could be true tomorrow.

Q. So it's impossible to always know which location will have the cheapest gas?

A. Correct. Not only that, but to the extent *Location B* has cheaper commodity prices tomorrow, a utility can only maximize those lower commodity prices to the extent the utility can get gas from that area, which is where firm pipeline transportation contracts come in.

Q. And "firm pipeline transportation contracts" are ones that utilities pay for year-round, regardless of how much they use them?

A. Correct. Think of it as a hedge. There can be value to the utility, and to the ratepayer, in being able to shift purchases from one supply location to another. To do that, utilities need multiple transportation contracts.

Q. So, utilities have multiple contracts on multiple pipelines to ensure they can reach the lowest cost gas?

A. Yes.

Q. But is there a limit on how many contracts a utility should have?

A. Not all utilities are the same, so there is no uniform number. However, I believe a utility should add new pipeline transportation contracts only to the extent those new contracts are needed to meet reasonable projections of demand and provide *ratepayer* value.

Q. So, turning to the three contracts, are you saying they do not provide ratepayer value?

A. In part. I wanted to do a thorough analysis, so I looked at all three contracts. Specifically, I looked at the likely gas commodity savings under these contracts and the likely fixed transportation costs the contracts would impose.

Q. And what did you conclude?

A. That when you look at the "all in cost," and the supply reliability benefit associated with meeting demand, only one of these contracts makes sense. For the other two, these pipeline contracts will not save ratepayers money, there is *de minimus* – if any – supply reliability benefit, and there is insufficient hedge value to justify the contracts.

Q. What are these three agreements, what pipelines are they with, what supply areas would they access, and where would the capacity enable deliveries?

A. The three agreements are on three separate pipelines. The first one I will discuss is an agreement for 62,500 Dthd on Elba Express.

ELBA EXPRESS PRECEDENT AGREEMENT

Q. You mentioned Elba Express earlier and said SCE&G did not have capacity on that pipeline. So what is this agreement?

A. The Elba Express precedent agreement is a new contract between Elba Express and SCE&G that is not yet serving SCE&G' generation or its gas customers. The contract concerns existing capacity on the Elba Express pipeline from the Transco line (from both of Transco's Zone 4 and Zone 5 tariff zones and Transco's Zone 4 Pricing location (also

referred to as Station 85) and Transco's Zone 5 South pricing point, respectively;[10] to DECGT at Port Wentworth. As noted, the supply area(s) are Transco Zone 5 South and Transco Zone 4 pricing locations. As I reviewed SCE&G's capacity inventory, I concluded that this contract makes sense to have.

Q. Why did you conclude that?

A. Southern LNG, Inc. ("SLNG") is building a liquefaction facility at Port Wentworth, Georgia. Once the facility becomes operational, it would be prudent for SCE&G to have firm capacity on Elba to obtain gas from Transco to serve both the Jasper plant[11] (which operates at a high load factor) and is located near Port Wentworth as well as to move whatever supplies are not used at Jasper to other DECGT-served SCE&G locations that DECGT has the capacity to move from there into the rest of the SCE&G system.[12] This capacity on Elba, coupled with SCE&G capacity on DECGT may also enable SCE&E to no longer rely on SCANA Energy Marketing's (SEMI's) capacity to serve the Jasper plant.[13]

TRANSCO SOUTHEASTERN TRAIL PRECEDENT AGREEMENT

Q. What is the second precedent agreement?

A. The second precedent agreement I will discuss is that between SCE&G and Transco.

[10] The Transco-Elba Express physical location is on the GA/SC border and the way Transco set up these facilities the GA side of the border is in Transco's tariff Zone 4 and those on the SC side of the border are in Transco's tariff Zone 5.

[11] SCE&G would serve the Jasper plant after receiving the gas from Elba into DECGT at Port Wentworth

[12] The DECGT postings of available capacity indicate that DECT can receive a maximum of [redacted] Dthd at the Port Wentworth location. However, anecdotally, Skipping Stone is informed that the full transfer capacity from DECGT Zone 2, where Port Wentworth is located, to Zone 1 may depend on local market demand and may not be the full [redacted] Dthd.

[13] I will discuss the relationship between SEMI and SCE&G, this SEMI capacity, and other SEMI capacity relating to the SEMI-SCE&G relationship in greater detail below.

Q. How large is this contract?

A. This precedent agreement is for [redacted] expansion project on the existing Transco system referred to as the Southeastern Trail Project ("SET").

Q. What supplies does it access?

A. It would access supplies available in Transco's Zone 5[14] in Virginia (including supplies priced as Transco's Zone 5 North pricing point).

Q. Where can SCE&G use the contract to deliver gas?

A. SCE&G can make deliveries to DECGT, Elba Express, and further southward. Notably, the capacity stretches from Transco's Zone 5 all the way down to Transco's Zone 3 in Louisiana (*i.e.*, Station 65).

Q. So what is the overall significance of this?

A. In short, it enables SCE&G to buy gas at the Transco Zone 5 North pricing point and deliver it to DECGT, Elba Express, and potentially to Gulf Coast markets (including to LNG export shippers with capacity beginning at Sta. 65 on Transco for delivery to LNG export locations further west and south on Transco).

Q. Is gas produced in or around Pleasant Valley (*i.e.*, in or around Transco Station 185) in Northern Virginia?

A. No.

Q. Then why do you refer to this location as a supply area?

A. It is a supply area in the sense that parties can trade gas in /at locations associated with either or both of the Transco Zone 5 North or Transco Zone 5 Pooling points' pricing points: gas they can trade (i) gas from other pipelines that flows into Transco, (ii)

[14] The capacity begins at the Pleasant Valley point of interconnection with the Dominion Cove Point pipeline at the far northern end of Transco's Zone 5 tariff Zone (and adjacent to Transco's Station 185) and is associated with the Transco Zone 5 North pricing location.

gas within Transco that is moved from the North into or past Zone 5 to the South; or (iii) gas moved from the South into and past Zone 5 to the North.

Q. When discussing the Elba Express Precedent Agreement, you concluded it was prudent for SCE&G to have that capacity. Do you have any conclusions with respect to the Transco SET precedent agreement?

A. I do. However I will discuss both that precedent agreement and the next agreement to be discussed following the next discussion.

MOUNTAIN VALLEY PIPELINE PRECEDENT AGREEMENT

Q. With respect to the third precedent agreement, please detail the pipeline, the quantity of capacity, the supply area(s) accessed and where the subject capacity enables deliveries to be made.

A. The third precedent agreement is between SCE&G and the yet-to-be-constructed Mountain Valley Pipeline ("MVP"). It provides for [redacted] Dthd of capacity starting from the region of Southwestern Pennsylvania generally associated with the Dominion South Point pricing location and proceeding from there to Transco in the vicinity of Transco's Station 165 in Virginia (also proximate to the Transco Zone 5 "pooling point" and Transco Zone 5 pricing point). This capacity does not deliver to any SCE&G generating plants or facilities' locations, nor would it deliver gas to either of DECGT or Elba Express. This capacity only delivers to Transco in Virginia.

Q. So, in other words, SCE&G could only use this capacity to deliver gas to Transco, and SCE&G would then have to use its Transco capacity (and possibly other capacity) to actually get gas to its generation fleet?

A. Correct

Q. Would this capacity be able to feed the capacity under the Transco Southeastern Trail project?

A. Yes. That would be how SCE&G would take the MVP gas to its facilities after Transco delivers the gas to DECGT or Elba Express. In addition, due to the fact that the Transco Southeastern Trail capacity reaches the Gulf Cost, the MVP gas could also be delivered there for Gulf Coast markets or for LNG export, as discussed above.

Q. Before we get to any conclusions or recommendations you may have for the Commission with respect to these two precedent agreements, are the costs associated with any of these three agreements in the current Fuel cost case?

A. Based upon the testimony I reviewed, I do not believe that that the Elba contract's costs are in this case. I know for sure that neither of the MVP nor Transco Southeastern Trail contracts' costs are in this case because both of those contracts are for new capacity and neither of those projects have been placed into service.

Q. Why then do you discuss the Elba contract, or the MVP and Transco Southeastern Trail contracts?

A. Specifically with respect to the MVP and Transco Southeastern Trail contracts, the reason they are important is that this Commission should look at the net effect on ratepayers of the costs to those ratepayers of capacity that SCE&E has signed up for under these two precedent agreements; and place SCE&G on notice that this Commission may disallow some or all of those contracts' costs to the extent they serve to increase ratepayers' costs beyond any benefit to ratepayers.

Q. Please proceed.

A. The Transco Southeastern Trail project, as I stated above, is for 125,000 Dthd. That project's SCE&G contract only connects SCE&G to a point in northern Zone 5 of Transco (the Transco Zone 5 North pricing point) [15] at a cost of [redacted] per Dth per day reservation charge. This Transco Southeastern Trail capacity will have a cost of [redacted] Dollars per year. In addition, paying at least [redacted] per Dth per day for [redacted] Dthd on MVP (which connects to the DOM South Point regional pricing) to Transco in Virginia raises the average price for connecting to this supply area by about an additional [redacted] Dollars per year. The total between them is [redacted] Dollars per year. As noted above, the MVP contract connects into Transco at the Transco Zone 5 "pooling point." Thus between these two contracts, consumer costs could be (if the Commission allows recovery) at least [redacted] per year higher than they are today, before any gas is purchased.

Q. And, how long are these two contracts?

A. The Transco Southeastern Trail contract is for [redacted] from commencement of service and the MVP contract is for [redacted] from commencement of service.

Q. OK, but what if the gas is cheaper where gas comes into MVP or where gas can be purchased into the Transco Southeastern Trail capacity; wouldn't that be a benefit to SCE&G ratepayers?

A. To determine whether there would be an advantage to SCE&G ratepayers to be gained by accessing supplies at Dominion South Point prices versus Transco Zone 5 South, I analyzed the annual and seasonal burn of each of SCE&G's units by source of

[15] The primary receipt point on the contract, as stated above is Pleasant Valley. That said, all points between the primary receipt point and the Primary delivery Point (in Louisiana) are available on a secondary capacity basis.

gas. Looking at the amount of gas purchased in Transco Zone 5 South (as well as gas purchased in Sonat's Zone 3) and which went to plants, which plants can make and have made use of Transco instead of Sonat including the Urquhart plant's Transco Zone 5 South purchases),[16] I can reasonably conclude that SCE&G can utilize all of the [redacted] Dth per day of Transco Southeastern Trail. In addition I can reasonably conclude that SCE&G could fully utilize the capacity on MVP that feeds Transco. In both cases, there was sufficient seasonal demand that SCE&G satisfied using gas purchased in Transco Zone 5 South or in Sonat's Zone 3 that could be displaced in order to make use of the MVP and Transco capacity respectively.

Q. Doesn't the analysis stop there?

A. Absolutely not. Just because you ***can*** use something doesn't mean you should. The question is, and should be, "does having this capacity provide value to SCE&G ratepayers?"

Q. Does it?

A. No. Bear in mind that when using natural gas, a utility must pay both for the gas itself (the commodity price) and the costs of reserving transport capacity and the variable cost of transporting (together transportation costs) it to its endpoint. Commodity prices obviously vary among supply areas, but transportation costs also vary among pipelines.

[16] Note that Urquhart is located off of Sonat yet was able to make use of some amount of gas sourced off of Transco Zone 5 South delivered into DECGT and delivered to Sonat for Urquhart by displacement (*i.e.,* reducing quantities that would otherwise flow into DECGT on Sonat) and making those deliveries to Urquhart instead of to DECGT.

Q. Why is that relevant?

A. Because a utility cannot simply look at which supply area is cheaper for gas commodity purchases; it must look at the total cost, which necessarily includes transportation costs.

Q. So what you're saying is that, "all-in," it may not be cheaper to buy gas from *Point A* instead of *Point B,* even if *Point A* gas is cheaper than *Point B* because transportation costs from *Point A* more than outweigh the savings?

A. Correct.

Q. And did you do this analysis here?

A. I did. To ascertain this, I analyzed NGI spot pricing in the following locations, pertinent to both SCE&G's past purchasing practices and locations and how displacing purchases at those locations would change costs of supply assuming the new contracts were used instead. In the first table below I estimate the net value to ratepayers for the two periods of 2017 and 2018 had the MVP contract (for [redacted] Dthd) and half of the Transco Southeastern Trail contract (*i.e.*, [redacted] Dthd of the [redacted] Dthd) been in place.

Figure 6

Per Dth Value of buying Dom South vs Listed Pricing Points --->	Days in Periods	Southern Natural	Transco Zone 5 North	Transco Zone 5 South	Savings on Gas Cost Dom SP vs Zn 5 South	Transport Cost on MVP and Transco	Net Value of MVP & 1/2 of Transco SET
Shoulders 2017	122	1.220	1.220	1.290	$9,836,250	[redacted]	
Shoulders 2018	122	0.485	0.605	0.620	$4,727,500		
Winter 2017/2018	151	0.335	0.650	0.670	$6,323,125		
Winter 2018/2019 thru 3/9	151	0.128	0.650	0.638	$6,016,406		
Summer 2017	92	1.020	1.045	1.130	$6,497,500		
Summer 2018	92	0.440	0.570	0.560	$3,220,000		
Totals for 2017 Prices					$22,656,875		
Totals for 2018 Prices					$13,963,906		

Source: NGI for Prices, SCE&G Response to CCL & SACE 1-2; and Analysis Skipping Stone

Q. Please explain what is in this table/Figure 6.

A. This table breaks the years 2017 and 2018 into natural gas pricing seasons. It first displays the shoulder months of April, May, September and October and the 122 days in the shoulder periods. Next, it displays the Winter periods of November through March of the next year and that period's 151 days. Then it displays the Summer pricing period of June, July and August and its 92 days.

Q. Before you continue, why did you break these periods out?

A. They are broken out because, in this case, the advantage of access to Dominion South Point associated and priced supplies varies by season; with Winter being less advantageous than either the summer or shoulder periods for the supplies from Transco Zone 5 South (or Sonat) that the Dominion South Point supplies would displace.

Q. Please continue with your explanation of the table.

A. The table also presents the positive savings on gas cost (*i.e*, without considering Transport cost) that purchasing at Dominion South Point would have had versus the gas

cost of purchases associated with Southern Natural (Sonat), Transco Zone 5 North, or Transco Zone 5 South.

Q. What did you do next?

A. Next the table calculated the fixed Transport cost (the cost of reserving the capacity as set forth in the precedent agreements). Finally, the table presents the mathematical "Net Value" of this arrangement where Transport Costs are subtracted from gas cost savings.

Q. And what does it conclude?

A. In order to have gotten the gas cost savings, money would have to have been spent on the capacity to access those cheaper supplies. As one can readily see in the table above, whatever money may have been saved in gas commodity purchases would have been lost in increased transportation costs. There would have been no net value to ratepayers in 2017 or 2018 under the proposed arrangements (*i.e.*, there would have been a loss by ratepayers which is an increase in their costs); and the net loss in 2018 would have been worse.

Q. In each season, the net loss in 2018 is greater than the net loss in 2017. Why?

A. In general, the price differential between different supply areas is collapsing.

Q. What does that mean?

A. It means that, generally speaking, gas commodity costs are converging throughout the country.

Q. Why is that?

A. Historically, supply areas that had insufficient pipeline infrastructure struggled to get their gas to markets. As such, those supply areas sold gas at a discount.

Q. Is that no longer the case?

A. Less and less so.

Q. Why?

A. Over the past decade or so, many pipeline companies have built new lines that connect supply areas to markets. As a result, the capacity constraints that caused producers to sell at a discount are shrinking, and prices are rebounding. In the vernacular, "basis"[17] is collapsing.

Q. OK, what about the "value" of the other half of the Transco Southeastern Trail agreement?

A. In the below table I show the difference in value between buying at Transco Zone 5 North versus buying either at Transco Zone 5 South or Southern Natural (Sonat).

Figure 7

Per Dth Value of buying At Transo Zone 5 North vs Listed Pricing Points --->	Days in Periods	Southern Natural	Transco Zone 5 North	Savings on Gas Cost Zn5 No. vs Zn5 So.	Transport Cost on Transco	Net Value of Other 1/2 of Transco SET
Shoulders 2017	122	0.070	0.070	$533,750	[redacted]	
Shoulders 2018	122	0.135	0.015	$114,375		
Winter 2017/2018	151	0.335	0.020	$188,750		
Winter 2018/2019 thru 3/9	151	0.510	(0.013)	($117,969)		
Summer 2017	92	0.110	0.085	$488,750		
Summer 2018	92	0.120	(0.010)	($57,500)		
Totals for 2017 Prices				$1,211,250		
Totals for 2018 Prices				($61,094)		

Source: NGI for Prices, SCE&G Response to CCL & SACE 1-2; and Analysis Skipping Stone

[17] "Basis" most simply is the difference in gas price at two locations. In the above table, the positive numbers under Southern Natural, and the Transco locations represents the "basis" differential between those locations and DOM SP. A positive value means that one would save that amount on gas costs buying at DOM SP versus the noted locations.

Q. Please explain what is in this table/Figure 7.

A. This table shows that while the Transco Southeastern Trail capacity can access the relatively cheaper supplies available at the Transco Zone 5 North pricing point, the net "value" to ratepayers would have been negative – in short, it too would have cost more in transport cost to access the cheaper gas than the savings in gas cost would have been.

Q. So what are the results here?

A. The total net loss to ratepayers in 2017 would have been the sum of the MVP/Transco path loss and the Transco alone path loss – a loss of [redacted] dollars. In 2018, owing to collapsing basis, the loss to ratepayers of these contracts would have grown to a loss of [redacted]

Although not shown in this table, it was also true that optimizing the accessing of supplies at the cheaper of the Transco Zone 5 Pool or Transco Zone 5 North, might, in some seasons, have been slightly better than accessing the Transco Zone 5 North supply prices alone, however, the overall difference in Net value (*i.e.*, ratepayer loss) would have been different by less than [redacted] dollars on average and in 2018 only; and this [redacted] would have only reduced the "net cost" to ratepayers for the half of Transco capacity not used for MVP supplies to [redacted] instead of [redacted] – in either case a large net cost to ratepayers.

Q. Why is it that while you show Sonat prices, you do not use them to make your net value to ratepayers calculations?

A. It is for two reasons. First, it is because historically, the Sonat prices were always the same or higher than the Transco Zone 5 North prices and to minimize gas costs, SCE&G would have displaced all of the Sonat gas that it could. SCE&G seems to have

done exactly that considering how much gas they purchased for Urquhart via Transco Zone 5 South locations rather than Sonat.

Q. And the second reason?

A. Second, were SCE&G to have Transco Southeastern Trail capacity, it would only change where SCE&G purchases gas on Transco to be delivered to DECGT and Elba and not where SCE&G purchases gas that ***has*** to be delivered on Sonat. While, in my view, it may be possible to displace some further amount of Sonat deliveries to DECGT, the recent expansions of DECGT to the Charleston area and to the Columbia Energy Center, to the extent they improved the ability of SCE&E to displace Sonat supplies, when economical to do so, would already have been seen in the purchases made and reported in discovery for the 2018 period. Again, neither of the two precedent agreements being discussed here increase the amount of supply deliverable to DECGT or Elba, they only change where that supply can be bought.

Q. Before you continue, isn't there an advantage to holding firm capacity in so far as you can make intraday purchases when power plant load is different than that projected in the day before, that is after the time when most trades are made and pipelines schedule gas?

A. That may be true on some pipelines; however, when it comes to Transco this is not the case. In the gas market, there is an electronic gas trading platform that facilitates physical within-day (*i.e.*, intraday trades). It is referred to as ICE (the Intercontinental Exchange). On ICE, one can trade day-ahead gas, month-ahead gas, year(s)-ahead gas; and, within-day gas.

Q. OK, but isn't it true, especially in the winter, that there is not much of this within-day trading – that it cannot be relied on?

A. Actually, no. While it may have been the case in the past, it is certainly no longer the case, especially on Transco and importantly on Transco with respect to Transco Zone 5 South within-day trading. Of note, in SCE&G's testimony (*See* direct testimony of Darrin Kahl at page 5 Lines 4-9), SCE&G states that it uses the ICE platform as a means of price discovery. It does not state whether it also uses ICE for actual purchases of gas (or sales of excess gas); both of which it could make use of ICE to achieve.

Q. Do you have current data to support your assertion?

A. Yes. I inquired of ICE which of its Transco gas trading locations could accommodate within-day trades. It said all of them accommodated within-day (what ICE called "same day") trading. *See* Exhibit GML 2, which was received from ICE and analyzed by me). Also see Figure 8 below which contains the analysis of ICE-provided data.

Figure 8

Analysis of Data From ICE

Product	Hub	Strip	Date	Total # of Deals	Volume			
		Same Day						
	GML Work from here down	Begin Date	12/3/2018	4,330	18,155,900			
		End Date	1/28/2019		Days --->	38		
	Locations	**PL**	**Rank**	**Deals**	**Volume**	**Deals/Day**	**Vol/Day**	**NGX Cleared**
NG Firm Phys. FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Transco	1	472	1,734,400	12.4	45,642	NGX Cleared
NG Firm Phys. FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Transco	2	351	2,263,600	9.2	59,568	NGX Cleared
NG Firm Phys. FP	**Transcontinental Gas Pipeline Corp. Zone 5 South**	**Transco**	**3**	**204**	**971,700**	**5.4**	**25,571**	**NGX Cleared**
NG Firm Phys. FP	Transcontinental Gas Pipeline Corp. - Zone 6 (NY)	Transco	4	143	425,600	3.8	11,200	NGX Cleared
NG Firm Phys. FP	Transcontinental Gas Pipe Line Corp. - Station 65 (Zone 3)	Transco	5	47	252,900	1.2	6,655	NGX Cleared
NG Firm Phys. FP	Transcontinental Gas Pipe Line Corp. - Zone 5 delivered (north of Stn 165)	Transco	6	36	158,900	0.9	4,182	
NG Firm Phys. FP	Transcontinental Gas Pipe Line Corp. - Zone 6 (non-NY north mainline) - north of Station 195, including Delta, excluding Marcus Hook and Trenton	Transco	7	1	2,000	0.0	53	NGX Cleared
NG Firm Phys. FP	Transcontinental Gas Pipe Line Corp. - Station 30 (Zone 1)	Transco	8	1	4,000	0.0	105	NGX Cleared

Source: ICE; Analysis Skipping Stone

Q. Among the Transco gas trading locations that ICE supports, does ICE feature Transco Zone 5 South?

A. Yes. ICE supports eight separate Transco gas trading locations. In fact, based upon data that ICE supplied, for the period December 3, 2018 through January 28, 2019 (the day before my inquiry to ICE) Transco Zone 5 South was the third most liquid Transco gas trading location behind Transco Zone 6 Pool (Station 210) and Transco Station 65 (where the Southeastern Trail contract terminates). During this 38 trading day period there were 204 Transco Zone 5 South within-day trades with a total amount of gas traded being just under 1 Bcf.

Q. What is the significance of these facts?

A. It means SCE&G can receive gas delivered out of Transco Zone 5 South without having to incur expensive firm capacity on Transco, which is exactly what the Company is proposing to do with its precedent agreement on Transco Southeastern Trail and MVP arrangements. SCE&G can continue to purchase day-ahead and intra-day gas as it has in the past, and it can supplement either or both by using ICE to accomplish these objectives. Moreover, ICE trades at the Zone 5 South location are "cleared"[18] by NGX which is owned by ICE and which communicates with Transco to get the gas from the seller to the buyer in an automated fashion. Moreover, this same-day ability to buy delivered gas anonymously would only pertain to what are likely to be relatively small quantities.

[18] The term "cleared" means that NGX knows who the buyer and seller are, but the buyers and sellers do not know who each other is. This means that SCE&G would remain anonymous.

Q. Why would that be the case?

A. Within-day or same day gas is that amount of incremental supply needed because the day-ahead purchases underestimated next day demand to some degree. I do not believe that SCE&G's forecasting and purchasing for next day demand would be so far off that it would need a full day's supply for one of its major power plants because it made a forecasting error of that magnitude; and if it did, that would be a separate issue to be addressed by this Commission.

Q. OK. Are you then saying that there is no operational advantage to holding firm capacity on Transco from Zone 5 North to Zone 5 South and beyond?

A. What this all boils down to is that the operational advantage of holding such firm capacity is *de minimis* at best, has to weighed against cost, and – with respect to any intra-day scheduling benefit – it has to be measured against an additional reality.

Q. What is that "additional reality"?

A. Well, in order to use the firm capacity on an intra-day basis, SCE&G still has to find a seller with available intra-day gas. Just having the capacity and the capability does not make the gas appear. That is why, on balance, I recommend that SCE&G: (1) continue its current purchasing practices,(2) not be allowed full recovery of its MVP and Transco Southeastern Trail contracts' costs, and (3) supplement its current gas purchasing practices with using ICE to obtain Transco Zone 5 South delivered intra-day supply when and to the extent needed.

Q. By stating that SCE&G not be allowed full recovery of its MVP and Transco Southeastern Trail contracts' costs, what would you recommend to this Commission that it do?

A. First, let me recap on this point, my analysis leads me to conclude that either these costs be disallowed altogether, or that SCE&G's allowed recovery be capped such that SCE&G's ratepayers are no worse off as a result of these contracts than ratepayers would have been absent the contracts; that is to say, that SCE&G keep the savings and bear the losses actually realized versus costs of purchasing the commensurate quantities at Transco Zone 5 South posted prices.

Q. On this point, how would you measure these "savings" and "losses"?

A. The Commission would compare the costs of gas as delivered to DECGT or Elba respectively[19] under these projects' contracts with posted index prices for Transco Zone 5 South. Then, to the extent the delivered unit cost of SCE&G gas through these contracts is less than the Transco Zone 5 South posted prices for delivered gas, SCE&G keeps this difference to offset the fixed reservation costs it is incurring but that ratepayers ***are not*** reimbursing. Likewise to the extent the delivered cost of SCE&G gas through these contracts is greater than the Transco Zone 5 South posted prices for delivered gas, ratepayers only reimburse unit costs at the Transco Zone 5 South posted costs (*i.e.*, unit prices).

[19] These costs would be comprised of the cost of gas, plus (a) the variable cost of transportation (*i.e.*, the usage rate) to get the gas all the way to DECGT or Elba; and, (b) the cost of "fuel retainage" by the pipelines under the contracts (which is gas taken by the pipeline (*i.e.*, purchased by SCE&G) but not delivered to SCE&G because it is used to fuel compressors along the way.

Q. What if it turns out that SCE&G "keeps savings" that exceed its costs including the reservation costs of these contracts?

A. The Commission could decide on a shareholder/ratepayer sharing mechanism or not. That would be up to the Commission. SCE&G would presumably want to recover any previously un-reimbursed costs plus interest prior to sharing; but again, that would be up to the Commission.

Q. That covers your recommendations 1 & 2. Are you suggesting with your recommendation 3 that the Commission require SCE&G use ICE to obtain intraday supplies to the extent needed?

A. Require, no, suggest that they do, to the extent they are not doing so today, yes. In my view it would be a "best practice" to make use of all reasonable and prudent procurement tools available in the market for the benefit of ratepayers; and to forego any use of procurement tools (including contracts) that do not reasonably and prudently benefit ratepayers.

Q. Because none of the costs of the three precedent agreements are in this case and your recommendations 1 & 2 relate to potential future costs, what is it that you recommend the Commission do about your recommendations 1 & 2 at this time?

A. I strongly recommend that the Commission put the company on notice that to the extent new contractual commitments increase costs above levels that would not be incurred absent those contractual commitments and absent clearly evidenced cost-effective, reliability benefits, SCE&G will have a heavy burden to objectively quantify such costs or face no recovery of such costs. It is only fair to the Company and gives it

time to find other parties to which it can release that capacity so that neither South Carolina ratepayers nor the Company shareholder face these costs.

THE SEMI CONTRACT

Q. You said in your summary that SCE&G has a suspect contract. Is that correct?

A. Yes. The SEMI supply contract with SCE&G.

Q. Please describe that contract.

A. The contract dates from 2004 and has a primary term that, as of the date of this testimony, expires on March 31, 2019. In discovery, SCE&G provided a copy of this contract (*See* CCL & SACE Response to 1-9, included in Exhibit GML 3 - *Confidential*) and stated in its response that SCE&G "maintained its supply agreement" under that contract "with SEMI" "[d]uring the Review Period" of this proceeding. Under the terms of that contract, [redacted]

[redacted]

Q. For this at least [redacted] dollars, what is SCE&G buying from SEMI?

A. Under the terms of the contract, and this is interesting, [redacted] The reason I say that is there is, in particular, one very important and troubling provision or, taken together, set of provisions and definitions set-out in the contract.

Q. Please elaborate.

A. First let me articulate that I have been writing, reviewing, operating, and assisting others with respect to gas supply and transportation contracts for more than 35 years at this point. With that said, it has been more than 30 years since I have seen a putatively "firm" supply contract, a contract with fixed fees paid to a supplier for a putatively "firm" supply obligation of a seller (as opposed to any of a buyer) that characterizes that supplier's firm obligation as an "up to" obligation.

[redacted]

[redacted]

4 **Q. Break that down for me. What's the critical point?**

[redacted]

7 **Q. How does that work?**

[redacted]

17 **Q. OK. What does all this mean to SCE&G's ratepayers?**

[redacted]

[redacted]

Q. Is there anything else wrong with the contract?

[redacted]

[redacted]

RECOMMENDATIONS

Q. Based upon all of your findings and observations with respect to this SEMI to SCE&G contract, what is your recommendation to this Commission?

A. I have four recommendations. They are:

1) Disallow the entire [redacted] of annual fixed reservation fee paid by SCE&G to SEMI;
2) Assuming disallowance of the reservation fee, permit, for this period of fuel cost reimbursement, the SCE&G payment of just the [redacted] per Dth above defined cost amounts;
3) Do not permit SCE&G to enter into (or renew) this type of agreement with any affiliate of SCE&G again; and
4) Moreover, if and to the extent SCE&G seeks to have any organization outside of its in-house fuel procurement group provide any gas procurement, transportation procurement, or transportation scheduling services for a fee or that charges SCE&G (and its ratepayers) allocated amounts from affiliate(s), *such services should be procured only through an RFP* that is circulated widely as there are numerous entities that provide such services and that would provide such services on terms far more advantageous to SCE&G ratepayers than those in the SEMI-SCE&G contract.

Q. Does that conclude your testimony?

A. It does.

Exhibit GML-1

Expert Testimony of Gregory M. Lander

Name of Case	Jurisdiction	Docket Number	Date
El Paso Natural Gas Company	Federal Energy Regulatory Commission	RP04-251-000	May 3, 2004 (Testimony)
El Paso Natural Gas Company	Federal Energy Regulatory Commission	RP08-426-000	May 19, 2009 (Answering Testimony) June 2, 2010 (Supplemental Answering Testimony)
El Paso Natural Gas Company	Federal Energy Regulatory Commission	RP10-1398-000	June 28, 2011 (Answering Testimony) March 4, 2014 (Answering Testimony)
Petition of Boston Gas Company and Colonial Gas Company, each d/b/a National Grid for Approval by the Department of Public Utilities for a Firm Transportation Contract with Algonquin Gas Transmission Company	Massachusetts Department of Public Utilities	13-157	December 12, 2013 (Direct Testimony)
Petition of Boston Gas Company d/b/a National Grid for Approval by the Department of Public Utilities of a twenty-year Firm Transportation Agreement with Tennessee Gas Pipeline Company, involving an expansion of Tennessee's interstate	Massachusetts Department of Public Utilities	15-34	June 5, 2015 (Direct Testimony)

pipeline running from Wright, New York to Dracut, Massachusetts, known at the Northeast Energy Direct Project			
Petition of Bay State Gas Company d/b/a Columbia Gas of Massachusetts for Approval by the Department of Public Utilities of a twenty-year Firm Transportation Agreement with Tennessee Gas Pipeline Company, involving an expansion of Tennessee's interstate pipeline running from Wright, New York to Dracut, Massachusetts, known at the Northeast Energy Direct Project	Massachusetts Department of Public Utilities	15-39	June 5, 2015 (Direct Testimony)
Petition of The Berkshire Gas Company for Approval of a Precedent Agreement with Tennessee Gas Pipeline Company, LLC, pursuant to G.L. c. 164, § 94A	Massachusetts Department of Public Utilities	15-48	June 5, 2015 (Direct Testimony)
Investigation of Parameters for Exercising Authority Pursuant to Maine Energy Cost Reduction Act, 35-A M.R.S.A. Section 1901	Maine Public Utilities Commission	2014-00071	July 11, 2014 (Direct Testimony)
Virginia Electric and Power Company's Integrated Resource Plan filing pursuant to Va. Code § 56-597 *et seq*.	Virginia Corporation Commission	PUR-2017-00051	August 11, 2017 (Direct Testimony)
In the Matter of the Laclede Gas Company's Request to Increase Its Revenues for Gas	Missouri Public Service Commission	**File No. GR-2017-0215**	September 8, 2017 (Direct Testimony)

Service In the Matter of the Laclede Gas Company d/b/a Missouri Gas Energy's Request to Increase Its Revenues for Gas Service		**File No. GR-2017-0216**	Consolidated and November 21, 2017 (Surrebuttal Testimony) Consolidated
Application of San Diego Gas & Electric Company (U902M) for Authority, Among Other Things, to Update its Electric and Gas Revenue Requirement and Base Rates Effective on January 1, 2019. Application of Southern California Gas Company (U904G) for Authority, Among Other Things, to Update its Gas Revenue Requirement and Base Rates Effective on January 1, 2019.	California Public Utilities Commission	Application 17-10-007 Application 17-10-008	Consolidated Direct Testimony May 14, 2018 Rebuttal Testimony June 8, 2018
Application of Virginia Electric and Power Company to revise its fuel factor pursuant to § 56-249.6 of the Code of Virginia	Virginia State Corporation Commission	PUR-2018-00067	Direct Testimony June 14, 2018
Application of Southern California Gas Company (U 904 G) and San Diego Gas & Electric Company (U 902 G) Regarding Feasibility of Incorporating Advanced Meter Data Into the Core Balancing Process	California Public Utilities Commission	Application 17-10-002	Direct Testimony July 2, 2018
Virginia Electric and Power Company's Integrated Resource Plan filing pursuant to Va. Code § 56-597 *et seq*.	Virginia Corporation Commission	PUR-2018-00065	August 13, 2018 (Direct Testimony)
In the Matter of Constellation Mystic Power,	Federal Energy Regulatory Commission	ER18-1639	September 4, 2018 (Cross Answering

LLC Docket No. ER18-1639			Testimony)
South Carolina Electric and Gas Company Application for Approval of Merger with Dominion Resources Docket Nos. 2017-370-E; 2017-305-E; and 2017-207-E	South Carolina Public Service Commission	Docket Nos. 2017-370-E; 2017-305-E; and 2017-207-E	September 24, 2018 (Direct Testimony)

Greg Lander, President
Skipping Stone LLC

Professional Summary:

As President of Skipping Stone Inc., Greg Lander is responsible for Strategic Consulting in the mergers and acquisition arena with numerous clients within the energy industry. Generally recognized in the energy industry as an expert, he has advised and/or given testimony at numerous Federal Energy Regulatory Commission (FERC), State, arbitration, and legal proceedings on behalf of clients and has advised as well as initiated standards formation before the Gas Industry Standards Board (GISB) (predecessor to the North American Energy Standards Board (NAESB)). As Founder, President, and Chief Technology Officer of TransCapacity Limited Partnership, he was responsible for conceiving, planning, managing, and designing Transaction Coordination Systems utilizing Electronic Data Interchange (EDI) between trading partners. As a founding member of GISB, he assisted in establishing protocols and standards within the Business Practices, Interpretations and Triage Subcommittees.

Professional Accomplishments:

- Handled all Due Diligence for purchaser (Loews Corp) in acquisitions of two interstate pipelines, one natural gas storage complex, and ethylene distribution and transmission systems (Texas Gas Transmission, Gulf South Pipeline, Petal Storage, Petrologistics, and Chevron Ethylene Pipeline) most in excess of $1 Billion. Developed purchaser's business case model, including rate/revenue models, forward contract renewal models, export basis modeling and revenue models, and operating cost and capex models. Coordinated Engineering and Environmental Due Diligence Teams integrating findings and assessments into final Diligence Reports.
- Assisted major electric retailer in 9 states with business case development for entry into North Eastern U.S. Commercial &Industrial natural gas marketing business. Identified market share of incumbents; retail registration process, billing processes; utility data exchange rules and procedures and developed estimates of addressable market by utility.
- Handled all economic Due Diligence for purchaser of large minority stake in Southern Star Gas Pipeline. Developed purchaser's business case model, including rate/revenue models and forward contract renewal models, assessed potential competitive by-pass of asset located in "pipeline alley", developed revenue models and operating cost and capex models. Coordinated Engineering, Pipeline Integrity, and Environmental Due Diligence Teams integrating findings and assessments into final Diligence Reports.
- Developed post-acquisition integration plans for inter-operability and alterations to system operations to take advantage of opportunities presented by synergistic facilities' locations and functions and complimentary contractual requirements. Implementation of plan resulted in fundamental changes to systems operations and improvement in systems, net revenues, capacity capabilities, and facilities utilization.

- Handled all economic analysis, modeling, and systems capability due diligence for potential purchaser in several preliminary or completed yet un-consummated pre-transaction investigations involving Panhandle Eastern, Northern Border, Bear Paw, Florida Gas, Transwestern, Great Lakes, Guardian, Midwestern, Viking, Southern Star, Columbia Gas, Midla, Targa (No. Texas), Ozark, ANR, Falcon Gas Storage, Tres Palacios, Rockies Express, Norse Pipelines, Southern Pines, Leaf River, LDH (Mont Belvieu), Kinder Morgan Interstate, Trailblazer, Rockies Express and South Carolina Gas Transmission.
- Post Texas Gas Transmission and Gulf South Pipe Line acquisitions, assisted with all investigations involving assessments and proposals for realizing potential synergies with/from asset portfolio; rate case strategy development and alternate case development; and strategies around contract renewal challenges.
- Headed up due diligence team in acquisition of multi-state retail (residential) natural gas and electric book by Commerce Energy.
- Headed up due diligence team in acquisition of multi-state retail (C&I) natural gas book by Commerce Energy.
- Served as lead consultant for consortium of end-users, Local Distribution Companies, Power Generators, and municipalities in several major FERC Rate Cases, service restructuring, and capacity allocation proceedings involving a major Southwestern U.S. Pipeline.
- Served as lead consultant and expert witness for consortium of end-users, Local Distribution Companies, Power Generators, and municipalities in major FERC rate case under litigation involving decades-long disputes over service levels, cost allocation, and rate levels.
- Served as lead consultant for consortium of end-users and municipalities in major FERC rate case involving implementation of proposed rate design, cost allocation, and rate level changes.
- Expert witness in numerous gas and electric utility rate cases; integrated resource plans; litigated service offerings and cost approval and allocation proceedings for public interest clients. Controversies, often involving hundreds of millions to billions of dollars over cases' time horizons, are common.
- Developed and critiqued Rate Case Models for several pipeline proceedings and proposed proceedings (as consultant variously to both pipeline and shippers). Activities included modeling (and critiquing) new services' rates, costs, and revenues; responsibilities included development of various alternative cost allocation/rate designs and related service delivery scenarios.
- Handled all market assessment, forward basis research, and transportation competition modeling for several proposed major pipelines and laterals, including two $1 Billion+ Greenfields projects that went into construction and operation providing new outlets for growing southwestern shale production. (Gulf Crossing and Fayetteville Lateral).
- Assessed supply and demand balance for Southwestern US (OK, TX, Gulf Coast and LA) including assessment of future demand and supply displacement associated with West Texas wind power development and its likely impact on pipeline export capacity from region.

- Assessed supply and demand balance for Northeast to Gulf Coast capacity additions including assessment of Gulf Coast demand and export growth and its likely impact on forward basis.
- Assessed start-up gas supply needs for Appalachian coal fired power plant, resulting in installation of on-site LNG storage and gasification to address lack of enough firm pipeline capacity to meet need.
- Assessed installed and projected wind-turbine capacity in ERCOT and its eventual impact on Texas electric market as wind power output approaches minimum ERCOT load levels.
- Designed and developed EDI based data collection system, data warehouse and web-based delivery system (www.capacitycenter.com) for delivering capacity data collected from pipelines to shippers, marketers, traders, and others interested in capacity information to support business operations and risk-management requirements.
- Designed pipeline capacity release deal integrating settlement system for firm users, including design and development for information services delivery on a transaction fee basis.
- Assisted client in developing proposals to increase pipeline capacity responsiveness and proposed market fixes that would create price signals around sub-day non-ratable flows, including rate proposals, sub-day capacity release markets, and measures to address advance reservation of capacity for electric generation fuel to meet sub-day generation demands.
- Developed “universal capacity contract” data model for storage of all interstate capacity contract transactions from all 60 major interstates in single database.
- Led design effort culminating in FERC-mandated datasets defining pipeline capacity rights, (including receipt capacity, mainline capacity, delivery capacity, segmentation rights, in and out of path capacity rights), Operationally Available Capacity, Index of Customers, and Transactional Capacity Reports (through GISB).
- Assembled consortium of utilities to investigate and develop large high-deliverability salt storage cavern in desert southwest (Desert Crossing). As LLC’s Acting Manager, was responsible for developing business case and economic models; handling all partner issues and reporting; coordinating all field engineering, facilities design, planning and siting; and managing all environmental, legal, engineering and regulatory activities. Wrote FERC Tariff. Brought project to NEPA Pre-Filing Stage and conducted non-binding Open Season, as well as assisted with prospective shipper negotiations. Project cancelled due to 2001 “California Energy Crisis” and contemporaneous Enron and energy trading sector implosions.
- Designed comprehensive retail energy transaction and customer acquisition data model, process flow, and transaction repository for web-based customer acquisition and customer enrollment intermediary.
- Experienced in negotiation and drafting (from both seller side and buyer side) of firm supply, firm transportation, firm storage, and power supply and capacity agreements for numerous entities including project financed IPPs and for new greenfields pipeline and expansion of storage system.

- Provided market entry assessment for large international manufacturing and service company seeking to enter U.S. micro-grid, combined heat and power, and integrated solar, gas & battery markets.
- Conducted interstate pipeline capacity utilization analysis for New England following winter of 2013/2014 price fly-up.
- Conducted PJM East interstate gas pipeline capacity utilization and comparative analysis between pipelines with standard NAESB nominating cycles versus those with near hourly scheduling practices.
- Conducted requirements analysis for several firms pursuing software selection of energy transaction systems.
- Instrumental in the formation of the GISB. Member of industry team that lead the development of the proposal for and bylaw changes related to the formation of NAESB.
- Provided support to numerous clients and clients' attorneys in disputes involving capacity contracts, capacity rights allocations, tariffs, rate cases, intellectual property rights cases, and supply contract proceedings as both up-front and behind the scenes expert.

Associations and Affiliations:

Longest serving Member of Board of Directors for NAESB and prior to that GISB – 23 years.

GISB Committees: Former Chairman, Business Practices Subcommittee – drafted approximately 450+ initial industry standards that are now codified FERC regulations (Order 567); Former Chairman, Interpretations Subcommittee – drafted and led adoption process for first 50+ standards interpretations; Former Chairman, Triage Subcommittee; Title Transfer Tracking Task Force; Order 637 GISB Action Subcommittee; and industry Common Codes Subcommittee. Currently member of NAESB Wholesale Gas Quadrant Executive Committee and of NAESB Parliamentary Committee

Past and Affiliations and Associated Accomplishments:

1981-1989: One of five initial employees of Citizens Energy Corporation, Boston Mass. Responsible for starting and growing Citizens Gas Supply, one of the first independent gas marketers of the early 1980's, into $200MM+ annual operation. Successfully lobbied for pipeline Open Access (Orders 436 and 636), introduction of pipeline Affiliated Marketer rules of conduct (Order 497), and Open Access to pipeline operational information (Order 563).

1989-1993: Independent Consultant - Natural Gas Projects, Pipeline Rate Cases, Project Financed Contract negotiations, and Independent Power markets

1993 – 1999: Founder and President, TransCapacity Service Corp – Software products and services related to pipeline capacity trading, nomination, and contracting. Raised $17 MM from industry player to establish TransCapacity. Successfully lobbied for Pipeline restructuring and formation of capacity release market (Order 636). Sold to Skipping Stone.

1999 – 2004: Principal and Partner, Skipping Stone – Energy market consultants

2004 – 2008: President of Skipping Stone following purchase of Skipping Stone by Commerce Energy, Inc.

2008: Repurchased Skipping Stone from Commerce Energy, Reformulated Skipping Stone as LLC with Peter Weigand

2008 to Present: President and Partner, Skipping Stone. In addition to handling book of clients, responsible for all Banking, Accounting, Operations, Risk Management and contract matters for Skipping Stone.

Education:

1977: Hampshire College, Amherst, MA; Bachelor of Arts

Publication:

2013: Synchronizing Gas & Power Markets - Solutions White Paper

Exhibit GML-2

Data From ICE

Product	Hub	Strip	Date	Total # of Deals	Volume
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 30 (Zone 1)	Same Day	12/21/2018	1	4,000
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 65 (Zone 3)	Same Day	1/23/2019	2	20,000
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 65 (Zone 3)	Same Day	1/22/2019	1	3,500
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 65 (Zone 3)	Same Day	1/18/2019	6	23,700
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 65 (Zone 3)	Same Day	1/17/2019	3	25,000
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 65 (Zone 3)	Same Day	1/16/2019	2	11,100
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 65 (Zone 3)	Same Day	1/15/2019	1	8,000
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 65 (Zone 3)	Same Day	1/14/2019	3	20,000
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 65 (Zone 3)	Same Day	1/10/2019	1	10,000
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 65 (Zone 3)	Same Day	1/8/2019	3	12,000
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 65 (Zone 3)	Same Day	1/4/2019	1	3,500
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 65 (Zone 3)	Same Day	1/2/2019	1	10,000
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 65 (Zone 3)	Same Day	12/27/2018	1	8,800
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 65 (Zone 3)	Same Day	12/21/2018	3	6,400
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 65 (Zone 3)	Same Day	12/18/2018	2	6,000
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 65 (Zone 3)	Same Day	12/17/2018	2	8,000
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 65 (Zone 3)	Same Day	12/13/2018	1	5,000
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 65 (Zone 3)	Same Day	12/11/2018	4	19,000
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 65 (Zone 3)	Same Day	12/10/2018	1	5,500
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 65 (Zone 3)	Same Day	12/7/2018	1	500
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 65 (Zone 3)	Same Day	12/6/2018	3	22,900
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 65 (Zone 3)	Same Day	12/5/2018	2	3,100
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 65 (Zone 3)	Same Day	12/4/2018	2	10,900
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 65 (Zone 3)	Same Day	12/3/2018	1	10,000
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	1/28/2019	3	8,100
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	1/25/2019	5	70,000
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	1/24/2019	10	54,100
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	1/23/2019	7	42,300
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	1/22/2019	6	26,300
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	1/18/2019	2	10,000
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	1/17/2019	2	4,300
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	1/16/2019	10	39,900
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	1/15/2019	9	67,800
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	1/14/2019	14	67,100
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	1/11/2019	5	19,500
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	1/10/2019	7	27,600
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	1/9/2019	1	10,000
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	1/8/2019	1	10,000
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	1/7/2019	9	38,400
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	1/4/2019	3	3,500
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	1/3/2019	3	9,400
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	1/2/2019	21	157,900
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	12/31/2018	8	109,700
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	12/28/2018	11	67,700
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	12/27/2018	1	2,400
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	12/26/2018	22	162,200
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	12/21/2018	11	48,000
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	12/20/2018	4	20,000
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	12/19/2018	11	74,000
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	12/18/2018	15	96,100
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	12/17/2018	60	401,900
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	12/14/2018	3	13,800
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	12/13/2018	6	35,800
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	12/12/2018	9	41,900
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	12/11/2018	7	32,600
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	12/10/2018	7	48,200
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	12/7/2018	5	18,400
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	12/6/2018	6	22,100
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	12/5/2018	7	45,000
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	12/4/2018	19	150,400
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Same Day	12/3/2018	21	207,200
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Zone 5 delivered (north of Stn 165)	Same Day	1/25/2019	2	10,000
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Zone 5 delivered (north of Stn 165)	Same Day	1/23/2019	1	10,000
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Zone 5 delivered (north of Stn 165)	Same Day	1/22/2019	2	14,000

NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Zone 5 delivered (north of Stn 165)	Same Day	1/11/2019	1	4,000
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Zone 5 delivered (north of Stn 165)	Same Day	1/9/2019	5	15,000
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Zone 5 delivered (north of Stn 165)	Same Day	1/8/2019	3	10,400
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Zone 5 delivered (north of Stn 165)	Same Day	1/7/2019	1	5,000
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Zone 5 delivered (north of Stn 165)	Same Day	1/4/2019	2	12,500
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Zone 5 delivered (north of Stn 165)	Same Day	12/18/2018	3	15,300
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Zone 5 delivered (north of Stn 165)	Same Day	12/17/2018	5	25,800
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Zone 5 delivered (north of Stn 165)	Same Day	12/14/2018	1	1,200
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Zone 5 delivered (north of Stn 165)	Same Day	12/10/2018	2	10,000
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Zone 5 delivered (north of Stn 165)	Same Day	12/5/2018	4	14,800
NG Firm Phys, FP	Transcontinental Gas Pipe Line Corp. - Zone 5 delivered (north of Stn 165)	Same Day	12/4/2018	4	10,900
NG Firm Phys, FP	north of Station 195, including Delta, excluding Marcus Hook and Trenton	Same Day	1/18/2019	1	2,000
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 5 South	Same Day	1/25/2019	8	45,000
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 5 South	Same Day	1/24/2019	10	45,700
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 5 South	Same Day	1/23/2019	24	129,700
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 5 South	Same Day	1/22/2019	27	139,900
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 5 South	Same Day	1/18/2019	1	3,000
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 5 South	Same Day	1/17/2019	4	13,300
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 5 South	Same Day	1/16/2019	9	31,800
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 5 South	Same Day	1/15/2019	2	6,200
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 5 South	Same Day	1/14/2019	10	16,500
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 5 South	Same Day	1/11/2019	6	16,300
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 5 South	Same Day	1/10/2019	3	11,300
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 5 South	Same Day	1/9/2019	3	10,800
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 5 South	Same Day	1/3/2019	4	19,000
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 5 South	Same Day	1/2/2019	2	11,800
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 5 South	Same Day	12/26/2018	4	30,500
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 5 South	Same Day	12/21/2018	3	12,800
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 5 South	Same Day	12/20/2018	5	24,100
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 5 South	Same Day	12/19/2018	8	46,000
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 5 South	Same Day	12/17/2018	13	104,000
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 5 South	Same Day	12/13/2018	1	4,900
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 5 South	Same Day	12/12/2018	9	46,500
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 5 South	Same Day	12/11/2018	7	19,500
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 5 South	Same Day	12/10/2018	3	17,200
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 5 South	Same Day	12/7/2018	6	21,500
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 5 South	Same Day	12/6/2018	6	30,300
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 5 South	Same Day	12/5/2018	17	66,800
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 5 South	Same Day	12/4/2018	9	47,300
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 (NY)	Same Day	1/25/2019	3	8,700
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 (NY)	Same Day	1/24/2019	5	19,800
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 (NY)	Same Day	1/23/2019	8	31,300
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 (NY)	Same Day	1/22/2019	13	22,900
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 (NY)	Same Day	1/18/2019	3	7,800
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 (NY)	Same Day	1/17/2019	7	18,800
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 (NY)	Same Day	1/16/2019	5	17,100
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 (NY)	Same Day	1/15/2019	1	5,000
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 (NY)	Same Day	1/14/2019	9	30,200
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 (NY)	Same Day	1/11/2019	5	13,500
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 (NY)	Same Day	1/10/2019	1	1,700
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 (NY)	Same Day	1/9/2019	1	500
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 (NY)	Same Day	1/8/2019	1	5,000
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 (NY)	Same Day	1/7/2019	2	10,000
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 (NY)	Same Day	1/3/2019	2	2,200
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 (NY)	Same Day	1/2/2019	16	59,200
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 (NY)	Same Day	12/27/2018	5	16,300
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 (NY)	Same Day	12/26/2018	2	7,600
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 (NY)	Same Day	12/21/2018	2	1,700
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 (NY)	Same Day	12/19/2018	3	9,000
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 (NY)	Same Day	12/18/2018	3	13,000
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 (NY)	Same Day	12/17/2018	14	39,200
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 (NY)	Same Day	12/13/2018	3	9,900
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 (NY)	Same Day	12/12/2018	10	26,600
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 (NY)	Same Day	12/11/2018	4	14,000
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 (NY)	Same Day	12/10/2018	2	2,600
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 (NY)	Same Day	12/7/2018	2	3,100
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 (NY)	Same Day	12/6/2018	5	10,400

NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 (NY)	Same Day	12/5/2018	2	6,700
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 (NY)	Same Day	12/4/2018	4	11,800
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	1/28/2019	7	21,500
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	1/25/2019	10	38,000
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	1/24/2019	19	83,500
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	1/23/2019	9	48,000
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	1/22/2019	24	86,400
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	1/21/2019	5	12,500
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	1/18/2019	3	6,500
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	1/17/2019	7	22,300
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	1/16/2019	8	30,600
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	1/15/2019	11	42,400
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	1/14/2019	10	34,300
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	1/11/2019	34	132,100
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	1/10/2019	19	51,500
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	1/9/2019	5	18,000
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	1/8/2019	13	39,000
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	1/7/2019	19	77,100
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	1/4/2019	10	25,400
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	1/3/2019	8	28,500
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	1/2/2019	22	107,900
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	12/31/2018	4	20,000
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	12/28/2018	7	30,000
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	12/27/2018	18	44,700
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	12/26/2018	9	27,800
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	12/21/2018	8	18,000
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	12/20/2018	12	38,400
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	12/19/2018	16	52,100
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	12/18/2018	26	89,800
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	12/17/2018	13	59,300
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	12/14/2018	5	14,400
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	12/13/2018	5	18,600
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	12/12/2018	23	84,100
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	12/11/2018	11	33,100
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	12/10/2018	6	21,200
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	12/7/2018	7	39,900
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	12/6/2018	8	28,400
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	12/5/2018	19	81,900
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	12/4/2018	28	109,400
NG Firm Phys, FP	Transcontinental Gas Pipeline Corp. - Zone 6 Station 210 Pool	Same Day	12/3/2018	4	17,800

PUBLIC VERSION

Analysis of Data From ICE

Product	Hub	Strip	Date	Total # of Deals	Volume	
		Same Day				
	GML Work from here down	Begin Date	12/3/2018	4,330	18,155,900	Total Same Day Figures
		End Date	1/28/2019		**Days --->**	38

	Locations	PL	Rank	Deals	Volume	Deals/Day	Vol/Day	NGX Cleared
NG Fi m Phys. FP	Transcontinental Gas P peline Corp. - Zone 6 Station 210 Pool	Transco	1	472	1,734,400	12.4	45,642	NGX Cleared
NG Fi m Phys. FP	Transcontinental Gas Pipe Line Corp. - Station 85 (Zone 4)	Transco	2	351	2,263,600	9.2	59,568	NGX Cleared
NG Fi m Phys. FP	**Transcontinental Gas Pipeline Corp. Zone 5 South**	**Transco**	**3**	**204**	**971,700**	**5.4**	**25,571**	**NGX Cleared**
NG Fi m Phys. FP	Transcontinental Gas Pipeline Corp. - Zone 6 (NY)	Transco	4	143	425,600	3.8	11,200	NGX Cleared
NG Fi m Phys. FP	Transcontinental Gas Pipe Line Corp. - Station 65 (Zone 3)	Transco	5	47	252,900	1.2	6,655	NGX Cleared
NG Fi m Phys. FP	Transcontinental Gas Pipe Line Corp. - Zone 5 delivered (north of Stn 165)	Transco	6	36	158,900	0.9	4,182	
NG Fi m Phys. FP	Transcontinental Gas Pipe Line Corp. - Zone 6 (non-NY north mainline) - north of Station 195, including Delta, excluding Marcus Hook and Trenton	Transco	7	1	2,000	0.0	53	NGX Cleared

Total numbr of Same Day trades on Transco 1,254 18,155,900 Total Qty of Same Day trades

472 Max Number of deals at any Transco location